What is claimed:

1. A composition comprised of nano-structured metal oxide particles, wherein said nano-structured metal oxide particles have a surface area to mass ratio of greater than or equal to 50 m^2/g, are comprised of primary particles in the size range of 5 nm to 50 nm and are mesoporous, having a pore size distribution between 2 nm and 30 nm, wherein said nano-structured metal oxide particles are thermally stable at a temperature of at least 600°C for at least 6 hours.

2. The composition of claim 1 further comprising at least one stabilizing agent.

3. The composition of claim 2, wherein said stabilizing agent is an oxo-anion species selected from the group consisting of phosphate, silicate, aluminate, tungstate, molybdate, polytungstate and polymolybdate.

4. The composition of claim 2, wherein said stabilizing agent is an oxide species selected from the group consisting of silica, alumina, aluminum phosphate, tungsten oxide and molybdenum oxide.

5. A catalyst comprised of the composition of claim 1 and at least one active ingredient selected from the group consisting of sulfates, vanadates, molybdates, tungstates, silica, alumina, metal oxides, metal salts and metals.

6. The composition of claim 1, wherein said nano-structured metal oxide particles comprise zirconia.

7. The composition of claim 6, wherein said primary particles are of a size between 5 and 20 nm, have a surface area of greater than or equal to 70 m^2/g and have a pore size distribution of about 2 nm to about 20 nm.

8. The composition of claim 7, wherein said nano-structured metal oxide particles have a tetragonal-to-monoclinic phase transition temperature of about 600°C or greater.

9. The composition of claim 8, wherein at least 90% of said nano-structured metal oxide particles are in tetragonal crystalline form.

10. The composition of claim 6, further comprising at least one stabilizing agent.

11. The composition of claim 10, wherein said stabilizing agent is an oxo-anion species selected from the group consisting of phosphate, silicate, aluminate, tungstate, molybdate, polytungstate and polymolybdate.

12. The composition of claim 10, wherein said stabilizing agent is an oxide species selected from the group consisting of zirconia, silica, alumina, aluminum phosphate, tungsten oxide and molybdenum oxide.

13. A catalyst comprised of the composition of claim 6 and at least one active ingredient selected from the group consisting of sulfates, vanadates, molybdates, tungstates, alumina, silica, metal oxides, metal salts and metals.

14. A method of producing a composition comprised of nanoparticles, said method comprising aging nanoparticle precursors in a liquid suspension at a temperature

of greater than or equal to 60°C while maintaining a pH of greater than or equal to pH 7.

15. The method according to claim 14, wherein said nanoparticle precursors comprise at least one oxide selected from the group consisting of zirconia, hafnia, titania, tin oxide, ceria, niobium oxide or tantalum oxide.

16. The method according to claim 14 further comprising adding at least one stabilizing agent.

17. The method according to claim 16, wherein said stabilizing agent is an oxo-anion species selected from the group consisting of phosphate, silicate, aluminate, tungstate, molybdate, polytungstate and polymolybdate.

18. The method according to claim 16, wherein said stabilizing agent is an oxide species selected from the group consisting of silica, alumina, aluminum phosphate, tungsten oxide and molybdenum oxide.

19. A method of producing thermally stable nano-structured particles comprising: (a) preparing a precursor solution comprised of nanoparticle precursors and a base solution; (b) precipitating a colloidal hydrous oxide by combining said precursor solution with said base solution at a final pH of pH 7 or greater; (c) treating said colloidal hydrous oxide with at least one stabilizing agent to form treated particles; and (d) drying said treated particles to form dried particles.

20. The method according to claim 19, further comprising calcining said dried particles to form calcined particles.

21. The method according to claim 19, wherein said nanoparticle precursors comprise a zirconium salt solution or an organic zirconium compound.

22. The method according to claim 19, wherein the said colloidal hydrous oxide is treated at a temperature of at least 80°C and a pH of at least pH 9.

23. The method according to claim 19, wherein said colloidal hydrous oxide is treated in a sealed autoclave at a temperature in the range of 80°C to 150°C.

24. The method according to claim 19, wherein said stabilizing agent is an oxo-anion species selected from the group consisting of phosphate, silicate, aluminate, tungstate, molybdate, polytungstate and polymolybdate.

25. The method according to claim 19, wherein said stabilizing agent is an oxide species selected from the group consisting of silica, alumina, aluminum phosphate, tungsten oxide and molybdenum oxide.

26. The method according to claim 20, wherein said calcining is conducted at a temperature of at least 600°C.

27. The method according to claim 26, wherein said calcined particles are thermally stable at a temperature of at least 600°C for at least 6 hours.